Breast cancer screening practices for women aged 35 to 49 and 70 and older

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Abstract

Objective To describe physician practices with regard to opportunistic screening for breast cancer in women aged 35 to 49 years and 70 years of age and older, and to identify the determinants associated with the practice of prescribing screening mammography.

Design Postal survey.

Setting Quebec.

Participants Simple random sample of 1400 general practitioners practising in Quebec in 2009.

Main outcome measures Five cancer screening practices among 4 types of female clientele and the factors influencing physicians in their practice of prescribing screening mammography.

Results The response rate was 36%. For women aged 35 to 49 years, more than 80% of physicians reported using practices judged adequate, except for the teaching of breast self-examination and referrals to genetic counseling (60% and 54%). For women 70 years of age and older with good life expectancy, only 50% of general practitioners prescribed screening mammography. For the 70 years of age and older age group without good life expectancy, for whom screening is not indicated, nearly half of physicians continued to do the clinical breast examination and more than one-third reviewed family history. The main determinants for the practice of prescribing mammography are a favourable attitude to screening, screening skills, peer support, belief in the efficacy of mammography, and sufficient knowledge of the issue and of recommendations.

Conclusion Improvements are needed in the practice of teaching breast self-examination to women aged 35 to 49 years and referring them to genetic counseling, as well as in prescribing mammography for women 70 years of age and older who are in good health. Public health actions to improve these practices should focus on physician attitudes and skills and on communicating clearer recommendations.

EDITOR'S KEY POINTS

• There has been an emphasis on routine breast cancer screening for women 50 to 69 years old, but opportunistic screening for certain groups of women who are not in this age group is also important and needs improvement.

• The messages and recommendations with respect to breast cancer screening must be clear.

• We must encourage physicians to provide instruction in breast self-examination and referrals for genetic counseling for young women with risk factors and to prescribe mammography for women 70 years of age and older with good life expectancy.

Aside from skin cancer, breast cancer is the most common form of cancer and the second most common cause of mortality in Canadian women.[1] In 2010, there were an estimated 23 200 new cases of breast cancer in Canadian women of all ages, 4450 of which were in women younger than 50 years of age and 6600 in women 70 years of age and older. While breast cancer mostly affects women aged 50 to 69 years, nearly half of new cases are in women who are not a part of the group targeted by routine screening.[1]

Breast cancer screening programs in Canada targeting women aged 50 to 69 years are creating confusion with respect to opportunistic screening of non-targeted groups. Several studies show that women aged 70 years and older tend to be diagnosed with later stages of breast cancer compared with younger women.[2,3] Early detection of breast cancer in women not only improves the chances of survival,[4] but also leads to less invasive treatment.[5] Breast cancer is less common but more aggressive in women aged 50 years and younger; it is often diagnosed at an advanced stage[6] and associated with genetic mutations.

Studies on breast cancer screening practices for women aged 40 to 49 years are mostly American, because the 2002 US Preventive Services Task Force[7] recommends mammography screening beginning at age 40 years.[8-13] According to these studies, physicians do not follow the recommendations for women aged 40 to 49 years as closely as the recommendations for older women.[13,14] In Quebec, all[15-18] but one study[14] was on routine screening (ages 50 to 69 years).

Recommendations for age limits for breast cancer screening (**Box 1**)[19-23] are not consistent, which can and does result in confusion.

Several studies have examined the determinants of medical practice as it relates to breast cancer screening. Determinants with respect to physician characteristics that favourably influence the practice of prescribing

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Box 1. Recommendations for age limits for breast cancer screening

• The 2009 US Preventive Services Task Force recommends mammography for women aged 50 to 74 years,[19] whereas the Canadian recommendation applies to women aged 50 to 69 years.[20]

• The 2005 American Geriatrics Society Clinical Practice Committee recommends that screening mammography continue until age 85 years, based on state of health.[21]

• The 2009 National Comprehensive Cancer Network does not set an upper age limit, but advocates that screening begin at age 40 years.[22]

• At present, there are no standardized criteria for genetic screening.[23]

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mammograms are younger age,[24,25] female sex,[9,11,12,15,26] a favourable attitude toward mammography and belief in its efficacy,[24,27] a gynecologic practice,[8,24,27,28] and thorough knowledge of prevention.[10,15,27] Practice setting characteristics that support screening include having a group practice,[9] an urban[25] and university setting,[29] and a low patient load.[15] Last, certain patient characteristics favourably influence physician practice; these include the woman's motivation for having a mammogram, her compliance with the recommendation, and a positive family history of breast cancer.[10]

Because a physician's recommendation is the most influential factor in a woman's decision to have a mammogram,[30] it is important to understand the practices of front-line physicians.

Thus, the objective of our study is to describe physician practices with regard to opportunistic screening for breast cancer in women aged 35 to 49 years and aged 70 years and older, and to identify the determinants associated with the practice of prescribing screening mammography.

METHODS

A postal survey was sent to a simple random sample of 1400 general practitioners practising in Quebec. The sample was drawn from the list of the Fédération des médecins omnipraticiens du Québec (FMOQ), representing the 8452 general practitioners who practised in Quebec in 2009. Physicians in active practice whose clients included women aged 35 years and older were included.

An anonymous, self-administered questionnaire was developed in French based on questionnaires used in similar studies.[14,31-33] The questionnaire was validated by experts and pretested with 10 general practitioners. The variables that were addressed were inspired by the Walsh and McPhee model (1992).[34] The descriptive variables concerned breast cancer screening practices (review of family history of breast cancer, instruction in breast self-examination [BSE], performing clinical breast examination [CBE], prescribing mammography, and referral to genetic counseling) among 4 types of patients (women aged 35 to 49 years with or without risk factors [RFs] and women 70 years of age and older with or without good life expectancy [GLE] of 5 years or longer). For referral to genetic counseling, the 35- to 49-year-old group with RFs was divided into 2 groups: with family RFs and without family RFs. The dependent variables corresponded to the practice of prescribing mammography and the other variables related to the characteristics of the physicians and of the patients, as well as organizational or situational factors (**Table 1**).

Table 1. List of independent and control variables

FACTORS	CHARACTERISTICS
Physician characteristics	

• Predisposing factors	• Sociodemographic characteristics
	  –Age
	  –Sex
	• Attitudes and beliefs
	  –Attitudes
	• Personal prevention habits

• Facilitating factors	• Training • Knowledge • Skills • Previous clinical experience • Logistic factors
• Reinforcing factors	• Peer support or social norm • Identification of cases
• Organizational factors and health system factors	• Consultation setting • Type of practice • Location of practice • Access to services • No. of patients
• Situational factors or action triggers	• Quick reference guide
Patient characteristics	
• Patient factors	• Age of patients • Motivation • Compliance • Level of information • Previous mammograms • Family history of breast cancer

The questionnaire was sent out in November 2009, accompanied by a letter of support from the president of the FMOQ. A scientific incentive (summary of the recommendations for breast cancer screening) was offered to all the participants. Two reminders were sent out in accordance with the 2007 Dillman method (adapted).[35]

This study was approved by the research ethics board at Hôpital Charles LeMoyne in Longueuil, Que.

Statistical analyses

The analyses were performed using SAS and SPSS (version 17). Descriptive analyses were used to describe the physicians' profiles and practices. Bivariate analyses were performed between the dependent variables and the various independent variables. Spearman ρ, Kendall τ-b, Wilcoxon, Mann-Whitney, and Kruskal-Wallis tests were performed because of the nonnormal distribution.

The dependent variable, ie, the frequency of mammography prescription, was represented by responses in the form of a Likert scale (never, sometimes, often, always) and was considered a continuous variable in order to generate a score from 1 to 4. A score of 1 corresponded to the undesirable practice and a score of 4 corresponded to the optimal practice, based on the existing recommendations and expert opinions (**Table 2**).[19,21,22,36,37] This score was presented for the 4 types of patients. An overall score for mammography prescription (ranging from 4 to 16) for all of the women, regardless of age or RFs, was also developed by adding up all the scores. Screening practices deemed adequate (**Table 2**) were defined as follows: for young women with no RFs, instruction in BSE and mammography are not indicated. For women 70 years of age and older with GLE, only CBE and mammography are indicated. For women aged 35 to 49 years with RFs, all the breast cancer screening practices are recommended, whereas for women 70 years of age and older without GLE, no practice is indicated. Certain independent variables were also converted into scores: attitude, belief in the efficacy of mammography, peer support, screening skills, barriers, and knowledge of the recommendations and of the issue. These scores were supported by factorial analyses.

Finally, multivariate analyses were performed between the dependent and the bivariately significant independent variables for each type of patient. Two confounding variables were integrated into the models, ie, the age and sex of the physician. Three multiple linear regression models (respecting the conditions of homoscedasticity of normality and linearity) and 2 logistic

Table 2. Criteria used to determine adequate breast cancer screening practices, for certain risk categories

RISK CATEGORIES AMONG WOMEN	BREAST CANCER SCREENING PRACTICES			
	REVIEW OF FAMILY HISTORY OF BREAST CANCER	INSTRUCTION IN BREAST SELF–EXAMINATION	CLINICAL BREAST EXAMINATION	PRESCRIBING MAMMOGRAPHY
35–49 y with no risk factors	Yes*	No[†‡§]	Yes[‖]	No[§]
35–49 y with risk factors	Yes*	Yes[*‖]	Yes[‖]	Yes[*‖]
≥70 y with good life expectancy	No*	No[†‡§]	Yes[¶]	Yes[¶]
≥70 y without good life expectancy	No*	No[†‡§]	No*	No[¶]

*Expert opinion.
[†]Baxter and the Canadian Task Force on Preventive Health Care, 2001.[36]
[‡]Society of Obstetricians and Gynaecologists of Canada, 2006.[37]
[§]US Preventive Services Task Force, 2009.[19]
[‖]National Comprehensive Cancer Network, 2009.[22]
[¶]American Geriatrics Society Clinical Practice Committee, 2005.[21]

regression models (given that the assumptions of linear regression were not respected) were developed. The α threshold was .05.

RESULTS

The response rate was 36% (460 of 1279); 121 were excluded owing to retirement or incompatible practice. Most participants were 40 years of age and older (78%) and had been practising for at least 10 years (80%), and a little more than half were women (**Table 3**). Participants were similar to the starting sample according to sex and years in practice. Participants did not differ from the FMOQ population, but the latter differed from the sample in age and years of practice (**Table 4**).

For women aged 35 to 49 years, more than 80% of physicians reported using practices deemed adequate, except for instruction in BSE and referral for genetic counseling (60% and 54%). For women 70 years of age and older with GLE, only 50% of general practitioners prescribed screening mammography. For the 70 years and older age group without GLE, for whom screening is not indicated, nearly half of physicians continued to perform CBE and more than one-third continued to review family history (**Tables 5** and **6**).

The determinants of a mammography prescribing practice that is deemed adequate are a favourable attitude to screening, screening skills, peer support, belief in the efficacy of mammography, sufficient knowledge of the issue and of recommendations, a high number of patients seen in the practice setting, and a high number of women aged 35 to 49 years seen for periodic health examinations (**Tables 7** and **8**).

Table 3. Characteristics of participants

VARIABLES MEASURED	N* (%)
Age group (n = 453)	
• 20–39 y	98 (21.6)
• 40–59 y	279 (61.6)
• ≥60 y	76 (16.8)
Sex (n = 453)	
• Male	206 (45.5)
• Female	247 (54.5
Family medicine residency (n = 449)	
• Yes	282 (62.8)
• No	167 (37.2)
Years of practice (n = 453)	
• 0-9 y	89 (19.6)
• 10-19 y	106 (23.4)
• ≥20 y	258 (57.0)
Geographic setting (n = 451)	
• Rural	98 (21.7)
• Urban	224 (49.7)
• Semiurban	129 (28.6)
Practice setting†	
• Group practice (n = 452)	265 (58.6)
• Solo practice (n = 451)	39 (8.7)
• Long-term care centre (n = 451)	12 (2.7)
• Hospital (n = 451)	53 (11.7)
• Other (n = 452)	27 (6.0)
Type of practice†	
• Drop-ins and emergency (n = 451)	53 (11.8)
• Consultations with appointments (n = 450)	240 (53.4)
• Other clinical activities (n = 450)	30 (6.6)
• Nonclinical activities (n = 451)	7 (1.6)

*For each variable, results are presented for those who responded to the question only.
†Defined as being the practice to which the physician dedicates more than 50% of his or her time. Total percentages for each of these 2 variables do not add up to 100% because each practice setting or type of practice is analyzed separately.

Table 4. Comparison of characteristics of participants who were eligible for the starting sample and the FMOQ population

VARIABLES	PROPORTION OF ELIGIBLE PARTICIPANTS (N* = 453)	PROPORTION OF STARTING SAMPLE (N = 1400)	PROPORTION OF FMOQ POPULATION (N = 8452)	P VALUE†	P VALUE‡	P VALUE§
Age group				.046	.010	.448
• 20–39 y	21.6	18.5	21.6			
• 40–59 y	61.6	61.9	59.4			
• ≥60 y	16.8	19.6	19.0			
Sex				.378	.359	.217
• Male	45.5	47.2	48.3			
• Female	54.5	52.8	51.7			
Years of practice				.416	.004	.512
• 0-9 y	19.6	18.7	21.8			
• 10-19 y	23.4	25.6	23.3			
• ≥20 y	57.0	55.7	55.0			

FMOQ—Fédération des médecins omnipraticiens du Québec.
*This number corresponds to the number of individuals who responded to the questions only.
†The χ² tests were performed to compare eligible participants to non-participants from the starting sample.
‡The χ² tests were performed to compare the starting sample to the non-sampled FMOQ population.
§The χ² tests were performed to compare eligible participants to non-participants from the FMOQ population. This comparison was deemed useful because statistically significant differences exist between the starting sample and the FMOQ population for the age groups and years of practice.

Table 5. Frequency of breast cancer screening practices self-reported by physicians according to the risk categories of asymptomatic women of different age groups

	SELF-REPORTED BREAST CANCER SCREENING PRACTICES*			
RISK CATEGORIES	OFTEN OR ALWAYS REVIEW FAMILY HISTORY OF BREAST CANCER, N (%)	OFTEN OR ALWAYS PROVIDE INSTRUCTION IN BREAST SELF-EXAMINATION, N (%)	OFTEN OR ALWAYS PROVIDE CLINICAL BREAST EXAMINATION, N (%)	OFTEN OR ALWAYS PRESCRIBE MAMMOGRAPHY, N (%)
35-49 y with no risk factors for breast cancer	430 (87.9)	425 (37.6)	430 (83.7)	430 (19.5)
35-49 y with risk factors for breast cancer	422 (93.6)	418 (59.6)	422 (92.2)	422 (81.5)
≥70 y with good life expectancy (more than 5 y)	426 (65.0)	424 (20.8)	429 (79.0)	422 (50.7)
≥70 y without good life expectancy (less than 5 y)	426 (35.0)	423 (7.1)	430 (47.4)	428 (8.6)

*For each practice and risk category, results are presented for physicians who responded to the questions only.

Table 6. Frequency of referral to genetic counseling for breast cancer self-reported by physicians according to the risk categories of asymptomatic women of different age groups

RISK CATEGORIES	OFTEN OR ALWAYS REFER FOR GENETIC COUNSELING, N (%)*
35-49 y with no risk factors for breast cancer	427 (2.1)
35-49 y with no familial risk factors for breast cancer	426 (10.1)
35-49 y with familial risk factors for breast cancer	427 (54.3)
≥70 y with good life expectancy (more than 5 y)	430 (4.7)
≥70 y without good life expectancy (less than 5 y)	426 (1.9)

*Results are presented for physicians who responded to the questions only.

DISCUSSION

To our knowledge, this is the first Canadian study to explore the practices and determinants of breast cancer screening for women aged 35 to 49 years with and without RFs and for women 70 years of age and older with and without GLE. These are the groups of women for whom the recommendations are not always clear and for whom physicians might be uncertain which practices to adopt.

With respect to screening practices for women aged 35 to 49 years, more than 80% of physicians reported using practices deemed adequate. However, instruction in BSE presents a problem: while it is not recommended for women with no RFs, 38% of physicians continue to teach BSE,[19,36,37] and for women with RFs, nearly 40% of physicians do not teach the BSE even though the experts recommend it. These results are not surprising because some physicians report being uncomfortable with the contradictory information

circulating about instruction in BSE.[18] In addition, only 54% of physicians refer women with familial RFs for genetic counseling, even though it is recommended.[23]

Among women 70 years of age and older with GLE, only 50% of physicians prescribe screening mammography. This result is not surprising because the recommendations with respect to the upper age limit contradict one another. However, there is a consensus on limiting screening to women with life expectancies of longer than 5 years,[5] and this is why screening is not indicated for women 70 years of age and older without GLE. In spite of this, in our study, several physicians continued to perform CBE and to review the RFs in this group.

While most studies evaluate the determinants for breast cancer screening practices of physicians for women aged 50 to 69 years, our results on the determinants for these practices for younger women and older women are in line with the literature. Thus, a favourable attitude to screening,[27] peer support,[34] belief in the efficacy of mammography,[24,27] and knowledge of the recommendations and of the issue of breast cancer screening[10,15,27] are predictors of mammography prescribing. Our results show that screening skills are also a predictor; physicians who believe that they have the skills to perform screening prescribe mammography more often, even when it is not indicated.

Limitations
The main limitation of our study is its response rate; physicians are part of a population that does not tend to respond to surveys. The response rates in the literature for investigations into the same subject are similar, ranging from 20% to 55%.[8,9,25-27,29] A non-response selection bias is therefore possible, despite the relative comparability of the participants to the FMOQ population and to the starting sample. A second limitation is that our study involves self-reported practices, which can result in an overestimation of actual practices.[15,25] This overestimation could also

Table 7. Determinants for the practice of prescribing mammography for women 35 to 49 years of age with no risk factors, women 70 years of age and older with a good life expectancy, and women of all ages (correlation and multiple linear regression)

VARIABLE*	MODEL† 35-49 Y WITH NO RISK FACTORS ($R^2 = 0.351$)		MODEL† ≥ 70 Y WITH GOOD LIFE EXPECTANCY ($R^2 = 0.403$)		MODEL TOTAL SCORE PRESCRIPTION MAMMOGRAPHY ($R^2 = 0.263$)	
	SPEARMAN ρ CORRELATION COEFFICIENT	NON-STANDARDIZED REGRESSION COEFFICIENT	SPEARMAN ρ CORRELATION COEFFICIENT	NON-STANDARDIZED REGRESSION COEFFICIENT	SPEARMAN ρ CORRELATION COEFFICIENT	NON-STANDARDIZED REGRESSION COEFFICIENT
Attitude	0.472§	2.608§	0.513§	0.319§	0.407§	0.460§
Screening skills	-0.233§	-0.351‖	NS	NA	NS	NA
Peer support	NS	NA	0.443§	0.232§	0.300§	0.184¶
Belief in the efficacy of mammography	-0.441§	-2.184§	NS	NA	NS	NA
Knowledge	-0.183§	-0.238‖	0.160¶	0.027¶	NS	NA
No. of patients seen in practice setting	-0.151¶	-0.392‖	0.121‖	0.035‖	NS	NA
No. of women 35-49 y for PHE	NS	NA	NS	NA	0.110‖	0.019‖
Age of physician	-0.260§	-0.118§	NS	0.006‖	-0.163¶	NS
Sex of physician (woman)**	NS	NS	§	0.201§	§	NS
Group practice	NS	NA	NS	NA	0.125‖	NA

NA—not applicable, NS—not significant (*P* > .05), PHE—periodic health examination.
*Variables adjusted for the age and sex of physician in the multivariate analysis.
†Conversion into new dependent variable = (former dependent variable + 2)².
‡Conversion into new dependent variable = (former dependent variable + 0.8)$^{-0.7}$.
§*P* < .001.
‖*P* < .05.
¶*P* < .01.
**Mann-Whitney test performed bivariately.

Table 8. Determinants for the practice of prescribing mammography for women 35 to 49 years of age with risk factors and women 70 years of age and older without good life expectancy (correlation and logistic regression)

VARIABLE*	SPEARMAN RANK CORRELATION COEFFICIENT	LOGISTIC REGRESSION	
		OR	CI 95%
Women 35-49 y with risk factors (*P* < .0001 for the model)			
• Attitude	0.354†	2.262†	1.157-4.411
• Skills	0.290†	1.354§	1.116-1.663
• Peer support	0.290†	2.202†	1.167-4.142
• Belief in efficacy	0.300†	2.816†	1.572-5.162
• No. of women 35-49 y	0.152§	1.051†	1.009-1.097
• Group practice	0.132§	1.011†	1.001-1.021
• Knowledge	0.171†	NS	NA
• Age of physician	0.102†	NS	NA
• Sex of physician‖	NS	NS	NA
Women ≥70 y without good life expectancy (*P* < .0001 for the model)			
• Attitude	0.393†	4.279†	2.534-7.623
• Skills	-0.232†	0.783†	0.624-0.974
• Nonclinical activities	0.144§	1.117†	1.032-1.260
• Peer support	0.383†	NS	NA
• Belief in efficacy	-0.247†	NS	NA
• Knowledge	-0.160§	NS	NA
• Age of physician	-0.165§	NS	NA
• Sex of physician‖	NS	NS	NA

NA—not applicable, NS—not significant (*P* > .05), OR—odds ratio.
*Variables adjusted for age and sex in the multivariate analysis.
†*P* < .001.
‡*P* < .05.
§*P* < .01.
‖Mann-Whitney test performed bivariately.

affect certain determinants such as attitude, skills, and knowledge. A desirability bias is therefore possible, though anonymity might have decreased the effect of this bias. To minimize memory bias, we used short time frames in the questionnaire. Finally, our review of the literature made it possible to identify the confounding factors for which the multivariate analyses were adjusted.

The simple random sample means that our results can be generalized to all general practitioners in Quebec, and the relative comparability of the study participants, both in the sample and in the FMOQ population is a reassuring element.

Conclusion

Breast cancer mortality rates have decreased substantially over the past 25 years thanks to improvements in treatment and screening programs, but much remains to be done. We must pay more attention to women 50 years of age and younger and women 70 years of age and older in good health, because breast cancer in these populations represents a substantial burden and concrete solutions are available to physicians. For young women who are at risk, we must provide instruction in BSE, perform CBE, prescribe screening mammography, and, where appropriate, refer for genetic counseling. For older women in good health, CBE and prescribing mammography are appropriate. To improve these practices, we must act upon physicians' attitudes and skills and issue clearer recommendations.

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Contributors

Dr Kadaoui contributed to the study design; to data acquisition, analysis, and interpretation; and to writing the article. **Dr Guay** and **Dr Baron** contributed to the study design, to data analysis and interpretation, and to writing the article. **Dr St-Cerny** contributed to the data acquisition. **Dr Lemaire** contributed to the data analysis and interpretation. All authors reviewed and edited the article and approved the final version for publication.

Competing interests

None declared

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References

1. Société canadienne du cancer. *Statistiques sur le cancer du sein.* Toronto, ON: Société canadienne du cancer; 2010. Available from: **www.cancer.ca**. Accessed 2010 Jun 30.
2. Freyer G, Braud A, Chaibi P, Spielmann M, Martin J, Vilela G, et al. Dealing with metastatic breast cancer in elderly women: results from a French study on a large cohort carried out by the 'observatory on elderly patients'. *Ann Oncol* 2006;17(2):211-6.
3. Mustacchi G, Cazzaniga ME, Pronzato P, De Matteis A, Di Costanzo F, Floriani I, et al. Breast cancer in elderly women: a different reality? Results from the NORA study. *Ann Oncol* 2007;18(6):991-6.
4. Séradour B, Allioux C, Ancelle-Park R, Asad-Syed M, Barreau B, De Wold C, et al. *Le dépistage du cancer du sein. Un enjeu de santé publique.* 2nd ed. Paris, Fr: Springer; 2007.
5. Institut national du cancer. *État des lieux et perspectives en oncogériatrie.* Boulogne-Billancourt, Fr: Institut national du cancer; 2009. Available from: **www.e-cancer.fr/soins/prises-en-charge-specifiques/oncogeriatrie/le-rapport-d'expertise**. Accessed 2010 Jun 30.
6. Brennan M, French J, Houssami N, Kirk J, Boyages J. Breast cancer in young women. *Aust Fam Physician* 2005;34(10):851.
7. US Preventive Services Task Force. *Screening for breast cancer.* Rockville, MD: US Preventive Services Task Force; 2002. Available from: **www.ahrq.gov/CLINIC/uspstf/uspsbrca.htm**. Accessed 2009 Aug 20.
8. Slanetz PJ, Moore RH, Hulka CA, Halpern EF, Habunek DA, Whitman GJ, et al. Screening mammography: effect of national guidelines on current physician practice. *Radiology* 1997;203(2):335-8.
9. Saver BG, Taylor TR, Treadwell JR, Cole WG. Do physicians do as they say? The case of mammography. *Arch Fam Med* 1997;6(6):543-8.
10. Nutting PA, Baier M, Werner JJ, Cutter G, Conry C, Stewart L. Competing demands in the office visit: what influences mammography recommendations? *J Am Board Fam Pract* 2001;14(5):352-61.
11. Dominick KL, Skinner CS, Bastian LA, Bosworth HB, Strigo TS, Rimer BK. Provider characteristics and mammography recommendation among women in their 40s and 50s. *J Womens Health* (Larchmt) 2003;12(1):61-71.
12. Bodle EE, Islam N, Kwon SC, Zojwalla N, Ahsan H, Senie RT. Cancer screening practices of Asian American physicians in New York City. *J Immigrant Minority Health* 2008;10(3):239-46.
13. Gany F, Trinh-Shevrin C, Aragones A. Cancer screening and Haitian immigrants: The primary care provider factor. *J Immigrant Minority Health* 2008;10(3):255-61.
14. Moreault L, Lavoie M. *Dépistage du cancer du sein: pratiques des médecins de la région de Québec.* Laval, QC: Centre de santé publique de Québec, Université Laval; 1997.
15. Haggerty J, Tamblyn R, Abrahamowicz M, Beaulieu MD, Kishchuk N. Screening mammography referral rates for women ages 50 to 69 years by recently-licensed family physicians: physician and practice environment correlates. *Prev Med* 1999;29(5):391-404.
16. Borduas F, Sauvageau L, Blais J, Doray G, Moreault L, Lemieux AP. *Étude exploratoire des perceptions des médecins au regard du programme québécois de dépistage du cancer du sein.* Quebec, QC: Direction de la santé publique de la Régie régionale de la santé et des services sociaux de Québec et Coordination des services régionaux du programme québécois de dépistage du cancer du sein; 2002.
17. Lebel A, Levesque GY, Desrosiers N, Robert S, Varin G. *Programme québécois de dépistage du cancer du sein (PQDCS). Étude de la perception des médecins de l'Estrie en regard du PQDCS.* Quebec, QC: Régie régionale de la santé et des services sociaux de l'Estrie; 2002.
18. Nguyen MN, Larocque D. *Programme québécois de dépistage du cancer du sein (PQDCS). Perception des médecins de Laval face à leur rôle en prévention du cancer du sein et au PQDCS.* Quebec, QC: Agence de la santé et des services sociaux de Laval; 2007.
19. US Preventive Services Task Force. *Screening for breast cancer.* Rockville, MD: US Preventive Services Task Force; 2009. Available from: **www.ahrq.gov/clinic/uspstf/uspsbrca.htm**. Accessed 2010 Jul 4.
20. Canadian Task Force on Preventive Health Care. *Screening for breast cancer.* London, ON: Canadian Task Force on Preventive Health Care; 1998. Available from: **www.canadiantaskforce.ca/_archive/index.html**. Accessed 2010 Jul 4.
21. American Geriatrics Society Clinical Practice Committee. Breast cancer screening in older women. New York, NY: American Geriatrics Society; 2005. Accessible à: **www.americangeriatrics.org/products/positionpapers/breast_cancer_position_statement.pdf**. Accessed 2009 Aug 20.
22. National Comprehensive Cancer Network. *NCCN clinical practice guidelines in oncology: breast cancer screening and diagnosis.* V.2.2009. Fort Washington, PA: National Comprehensive Cancer Network; 2009. Available from: **www.nccn.org**. Accessed 2009 Aug 20.
23. US Preventive Services Task Force. Genetic risk assessment and BRCA mutation testing for breast and ovarian cancer susceptibility: recommendation statement. *Ann Intern Med* 2005;143(5):355-61.
24. Czaja R, McFall S, Warnecke R, Ford L, Kaluzny A. Preferences of community physicians for cancer screening guidelines. *Ann Intern Med* 1994;120(7):602.
25. Gulitz E, Bustillo-Hernandez M, Kent EB. Missed cancer screening opportunities among older women: a provider survey. *Cancer Pract* 1998;6(6):325-32.
26. Ahmad F, Stewart DE, Cameron JI, Hyman I. Rural physicians' perspectives on cervical and breast cancer screening: a gender-based analysis. *J Womens Health Gender Based Med* 2001;10(2):201-8.
27. Keller B, Stutz EZ, Tibblin M, Ackermann-Liebrich U, Faisst K, Probst-Hensch N. Screening mammographies in Switzerland: what makes female and male physicians prescribe them? *Swiss Med Wkly* 2001;131(21-22):311-9.
28. Van Harrison R, Janz NK, Wolfe RA, Tedeschi PJ, Stross JK, Huang X, et al. Characteristics of primary care physicians and their practices associated with mammography rates for older women. *Cancer* 2003;98(9):1811-21.
29. Abdel-Malek N, Chiarelli AM, Sloan M, Stewart DE, Mai V, Howlett RI. Influence of physician and patient characteristics on adherence to breast cancer screening recommendations. *Eur J Cancer Prev* 2008;17(1):48-53.
30. Sharp PC, Michielutte R, Spangler JG, Cunningham L, Freimanis R. Primary care providers' concerns and recommendations regarding mammography screening for older women. *J Cancer Educ* 2005;20(1):34-8.
31. Beaulieu MD, Lebeau R, Landry D, Battista R, Jacques A, Blais R. *Enquête sur les opinions des médecins omnipraticiens de la région montréalaise concernant les recommandations sur le dépistage du cancer du sein et de la prostate. Direction de la santé publique.* Quebec, QC: Régie régionale de la santé et des services sociaux de Montréal-Centre; 2000.
32. National Cancer Institute. *National survey of primary care physicians' cancer screening recommendations and practices.* Bethesda, MD: National Cancer Institute; 2006. Available from: **www.cancer.gov**. Accessed 2009 Aug 20.
33. Dumoulin J, Gervais M, Ledoux E, Narasiah L, Pépin A. *Enquête auprès des médecins sur le dépistage du cancer du sein.* Sherbrooke, QC: Université de Sherbrooke; 1995.
34. Walsh JM, McPhee SJ. A systems model of clinical preventive care: an analysis of factors influencing patient and physician. *Health Educ Q* 1992;19(2):157-75.
35. Dillman DA. *Mail and Internet surveys: the tailored design method.* 2nd ed. New York, NY: John Wiley and Sons, Inc; 2007.
36. Baxter N. Preventive health care, 2001 update: should women be routinely taught breast self-examination to screen for breast cancer? *CMAJ* 2001;164(13):1837-46.
37. Rosolowich V; Breast Disease Committee of the Society of Obstetricians and Gynaecologists of Canada. Breast self-examination. *J Obstet Gynaecol Can* 2006;28(8):728-30.